Small Mammal Trapping in Successional Habitats: 2006 Progress Report
Kanuti NWR Progress Report FY07-0x

Purpose:	Small mammal trapping, post-fire trapping grids
Location:	"Mouse Lake" (N66.31302 W151.78695)
Dates:	August 23 – 27, 2006
Participants:	Lisa Saperstein, Chris Harwood, Stefan Kropidlowski, Adam Kokx
Transportation:	Charter Beaver
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Summary:
Small mammals were trapped between August 24-27, 2006 on four trapping grids established in 1991 and 1993 following a 1990 fire on Kanuti National Wildlife Refuge (NWR). Grids 1 and 2 (G1 and G2) are in burned mixed white spruce/paper birch (*Picea glauca*/*Betula papyrifera*) forest and G3 and G4 are in burned black spruce (*Picea mariana*). Grids were trapped annually, with a few exceptions, since their establishment until 2002; after that, the refuge switched to a biennial trapping schedule. Each grid consisted of 100 trapping stations separated by 10 m intervals, and each station was set with two snap traps and one cone pitfall trap. Grids were trapped for three trap nights (TN).

A total of 396 animals were captured on all four grids. Grid 3 was the most productive, with 112 captures, followed by G1 (105 captures), G2 (95 captures), and G4 (84 captures). Preliminary species composition, pending verification from the University of Alaska Fairbanks (UAF) Museum, was 279 yellow-cheeked voles (*Microtus xanthognathus*, 70.5%), 50 red-backed voles (*Clethrionomys rutilus*, 12.6%), 31 unidentified voles (*Microtus* spp., 7.8%), 17 shrews (*Sorex* spp., 4.3%), 13 northern bog lemmings (*Synaptomys borealis*, 3.3%), and 6 brown lemmings (*Lemmus trimucronatus*, 1.5%).

Introduction
A trapping project was initiated on the Kanuti NWR in 1991 to monitor changes in small mammal communities in two habitats following a 1990 wildland fire. Since 1950, 4,856 km^2 (73%) of the 6,625 km^2 refuge has burned, and 2,602 km^2 of this burned in 1990 and 1991. This project is unique to interior Alaska (Interior) in that trapping began one year following fire and has continued for the past 15 years. Most small mammal trapping projects in the Interior have focused on a gradient of different aged forest stands (West 1979, Johnson et al. 1995, Lehmkuhl 2000) or, if started soon after a fire, continued for only a few years (Swanson 1996).

Methods
A four-person crew was transported to "Mouse Lake" (Fig. 1) in two Beaver floatplanes on August 23, 2006. The crew split into two teams and set up G1 and G2 according to the draft Kanuti NWR Wildlife Inventory Plan (Saperstein 2001). The remaining grids were set up the following afternoon. Each grid consists of 100 trapping stations at 10 m intervals, and each station is equipped with two Museum Special snap traps and one conical pitfall trap. Pitfall traps have been left on-site in 55-gallon drums since the 2002 trapping effort, but snap traps are stored in Bettles and transported to the site for each trapping effort. Traps were set within 1.5 m of the metal poles marking the trapping station and were strategically placed along small mammal runs and other areas deemed likely to have high trapping probability.

Grids were checked for three consecutive trap nights. Trapped animals were stored in plastic bags, one bag per station, for transport back to camp. Each bag was marked with the date, grid, station, species, and trap type. This information was also recorded in waterproof notebooks along with information about whether a trap was sprung but empty, missing traps, and miscellaneous observations. Animals found alive in traps were released if they had not suffered life threatening injuries, but information about the capture was recorded in the notebooks.

Specimens were stored in a hole dug down to permafrost until they could be transported to a freezer in Bettles by the refuge's pilot/manager Mike Spindler. Spindler was able to pick up specimens every day in association with other work on the refuge. All specimens were sent to the UAF Museum for verification of species identification, recording of morphological and sex information, and entry of data into the Museum database.

Results

A total of 396 animals were captured on all four grids (Table 1, Fig. 2). Grid 3 was the most productive, with 112 captures, followed by G1 (105 captures), G2 (95 captures), and G4 (84 captures). Preliminary species composition, pending verification from the University of Alaska Fairbanks (UAF) Museum, was 279 yellow-cheeked voles (*Microtus xanthognathus*, 70.5%), 50 red-backed voles (*Clethrionomys rutilus*, 12.6%), 31 unidentified voles (*Microtus* spp., 7.8%), 17 shrews (*Sorex* spp., 4.3%), 13 northern bog lemmings (*Synaptomys borealis*, 3.3%), and 6 brown lemmings (*Lemmus trimucronatus*, 1.5%). Thirteen small mammals (11 yellow-cheeked voles and 2 red-backed voles) were found alive in traps and released. Ten birds were caught in snap traps, one of which was found alive and released. Seven of the birds were white-crowned sparrows (*Zonotrichia leucophrys*), two were Lincoln's sparrows (*Melospiza lincolnii*), and one was a yellow-rumped warbler (*Dendroica coronata).*

The total number of small mammals trapped has been similar since all four grids were established in 1993, with peaks in 1997, 2002, and 2006 and lows in 1994 and 2004 (Fig. 2). Species composition has changed over time, with yellow-cheeked voles first appearing in 1996 and comprising a major proportion of captures since 1997. In 2004, similar numbers of yellow-cheeked and red-backed voles were captured, but yellow-cheeked voles once again dominated the capture results in 2006. The proportion of "unidentified voles," typically consisting of meadow and tundra voles (*Microtus pennsylvanicus* and *M. oeconomus*, respectively), continued to increase in 2006.

Habitat type did not appear to play a distinct role in trapping success (Table 1). The two mixed-forest grids, G1 and G3, had the most captures (105 and 112 specimens, respectively), but the black spruce habitats were not far behind (95 and 84 specimens from grids 2 and 4, respectively). Trapping success was similar among grids in 2004, but in 2002 the two black spruce grids were the most productive with 290 (58%) of the total 494 captures.

Total captures declined each night on all grids (Table 2), as expected for removal experiments (White et al. 1982). Yellow-cheeked vole captures declined with trap night for all grids, but for some species, captures did not decline with time. Total number trapped of these species was small compared to the number of yellow-cheek captures, however, and the number trapped per night only differed from one to three individuals.

Discussion

Over 100 more animals were trapped in 2006 than during the last trapping effort in 2004, and the 2006 total was the third highest since the project was initiated. Trapping success in 2004 was the lowest in 10 years, possibly due to unusually hot, dry conditions. The increase in trapped specimens in 2006 suggests that the decline in 2004 was not due to maturation of the post-fire community.

Freezing the specimens saved considerable time in the field. When specimens are stored in alcohol, each animal must be weighed, cut open, and labeled before placing in alcohol. This often resulted in crews working late in the evening to prepare the specimens, and quality of the specimens was not as good as frozen ones. Transportation of ethanol on commercial flights also created problems as large quantities are considered a hazardous material. Freezing the specimens will also allow preparation of study skins, if desired.

Cost

Total cost of the project, excluding overtime, was $9,251 out of a $8,000 budget. In previous years, $9,000 - $10,000 had been allocated to the project, which would have resulted in a lower, or no, cost overrun in 2006.

Logistical Comments

- Ethanol is a hazardous material and the quantities used for the project cannot be transported on a commercial passenger flight. Transporting the alcohol between Bettles and "Mouse Lake" in a chartered plane is not a problem. If a refuge pilot is unable to pick up specimens on a daily schedule, or every other day, ethanol will be needed to store specimens. We had one 9.5 liter jug of alcohol on hand in case pick-up flights were delayed.
- The aluminum canoe and Kevlar Old Towne one-person canoe stored at the site were once again used to access Grids 2, 3, and 4 despite some leaking due to earlier bear damage. Two inflatable kayaks were also used, but occasional strong winds made them difficult to handle and caused people to switch to the hard bodied canoes. New pack canoes, purchased at the end of Fiscal Year 2006 should be used in 2008, although they will require more assembly time than the inflatables.

Acknowledgments

Thanks to the trapping crew (Chris Harwood, Stefan Kropidlowski, and Adam Kokx) who made this effort a success. Also thanks to Mike Spindler for picking up specimens and transporting them to Bettles.

Literature Cited

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Table 1. Small mammal captures on four trapping grids, Kanuti NWR, August 2006.

Species	Grid 1	Grid 2	Grid 3	Grid 4	Total
Yellow-cheeked vole	94	72	67	46	279
Red-backed vole	7	17	10	16	50
Shrew	2	6	6	3	17
N. Bog lemming	0	0	8	5	13
Unknown vole	1	0	17	13	31
Brown lemming	1	0	4	1	6
Grid total	105	95	112	84	396

Table 2. Small mammal trapping success by trap night (TN), Kanuti NWR, August 2006.

Grid	TN1	TN2	TN3	Total
Grid 1	53	31	21	105
Grid 2	44	33	18	95
Grid 3	53	33	26	112
Grid 4	47	20	17	84

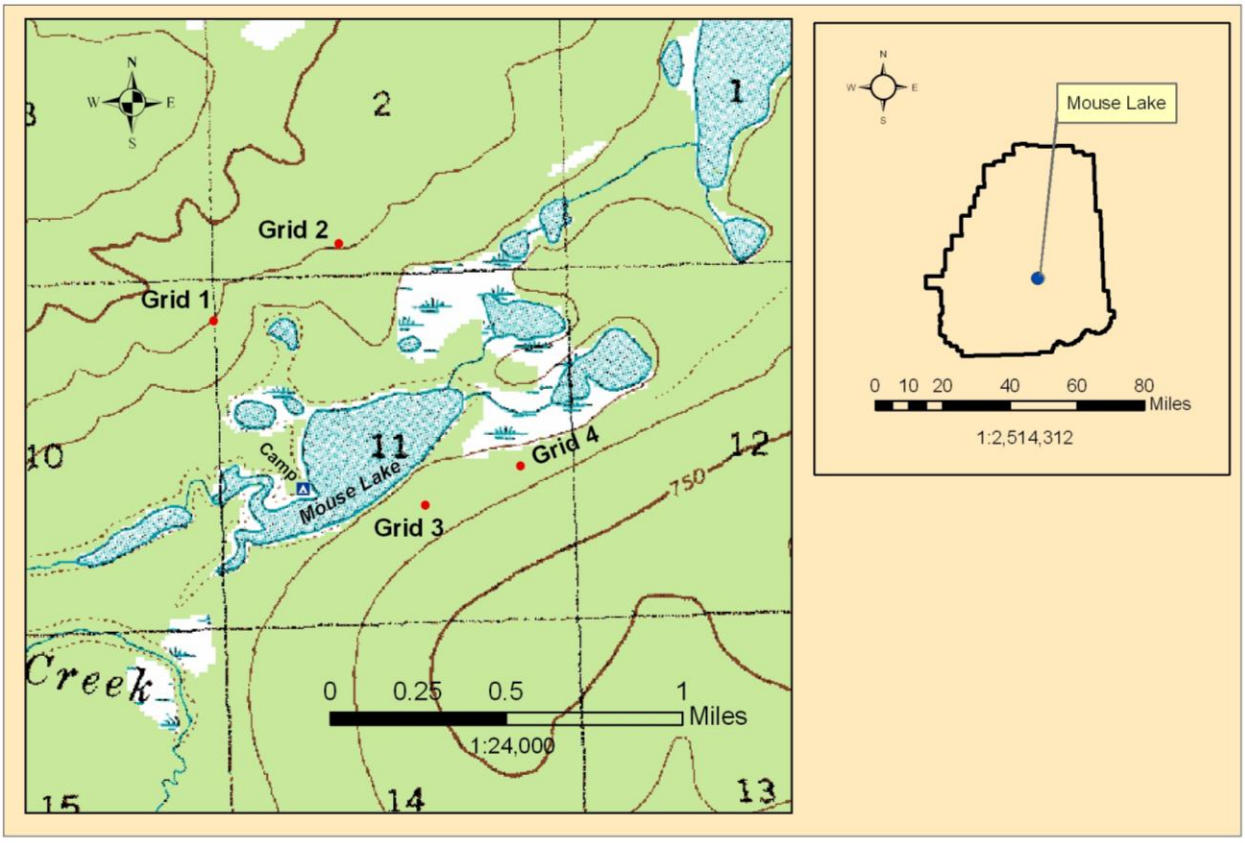

Figure 1. Location of trapping grids on "Mouse Lake," Kanuti NWR.

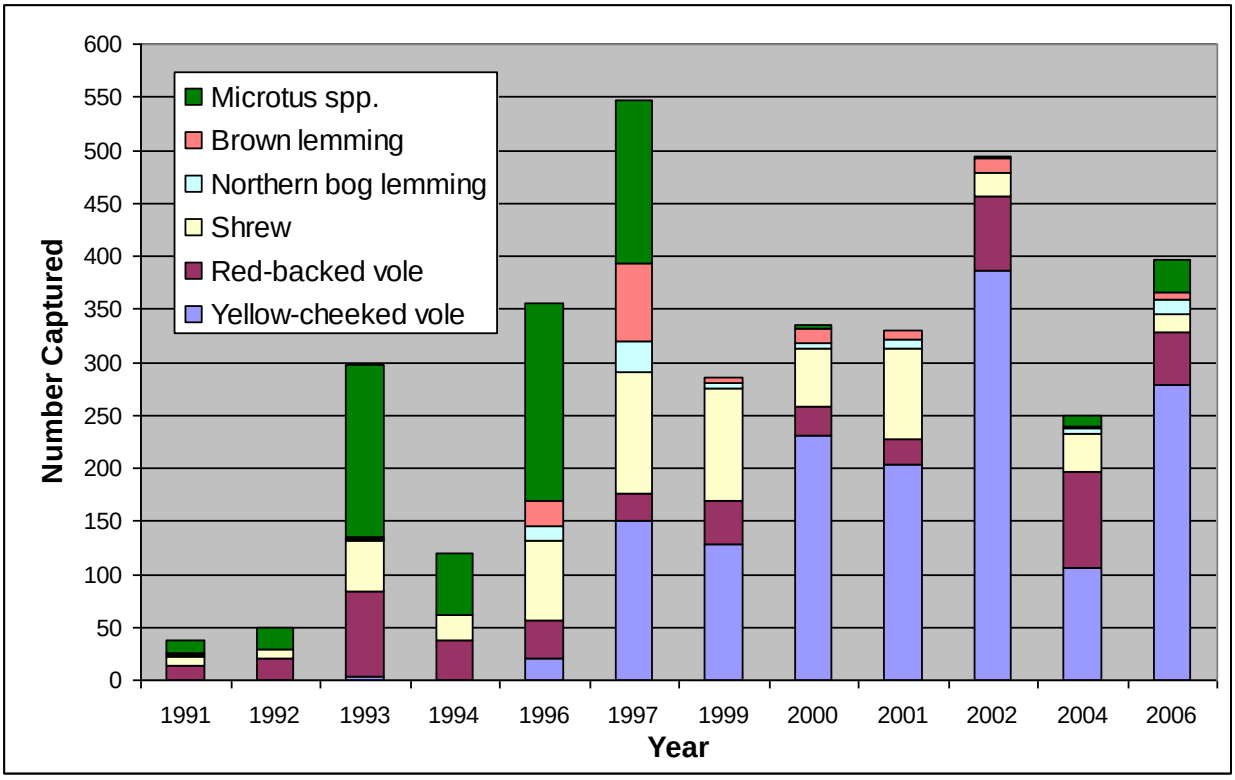

Figure 2. Trapping results on permanent trapping grids on Kanuti NWR, 1991 – 2006. Two grids were trapped in 1991 and 1992; four grids were trapped the remaining years.